

GEORGE C. MARSHALL SPACE FLIGHT CENTER
MSFC, MADISON COUNTY, ALABAMA
FACILITY No.: 709-0014

MAJOR SOURCE OPERATING PERMIT
FOURTH TITLE V RENEWAL
DRAFT: MARCH 30, 2020

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The proposed Title V Major Source Operating permit (MSOP) third renewal is issued under the provisions of ADEM Admin. Code R 335-3-16. The above named applicant has requested authorization to perform the work or operate the facility shown on the application and drawings, plans, and other documents attached hereto or on file with the Air Division of the Alabama Department of Environmental Management, in accordance with the terms and conditions of this permit.

Per ADEM Rule 335-3-16.12(2), an application for permit renewal shall be submitted at least six (6) months, but not more than eighteen (18) months, before the date of expiration of the current MSOP. The renewal application was due by July 2, 2019. The application was received at the Department on May 29, 2019. The proposed MSOP will expire on ????, 2025.

NOTABLE CHANGES

This Title V MSOP renewal will incorporate equipment covered by Air Permits into the MSOP that have been issued to Marshall Space Flight Center since the last issuance. The Air Permits that are being incorporated into the Title V are the following:

PERMIT NO.	DESCRIPTION
X025	Diesel Fired Emergency Generator 147 kW (197 HP) – Building 4583
X026	Diesel Fired Emergency Generator 36 kW (49 HP) – Building 4711
X027	Diesel Fired Emergency Generator 99 kW (133 HP) – Building 4666
X029	Four (4) Diesel Fired Emergency Generators <ul style="list-style-type: none"> • 180 kW (241 HP) – Building 4610 • 150 kW (201 HP) – Building 4651 • 148 kW (198 HP) – Building 4674 • 890 kW (1,194 HP) – Building 4755
	Removed the Building 4760 Grit Blaster from the Abrasive Blasting section of the permit.
	Hand wipe cleaning (HW CLEAN) and the Air Stripper (A-01) have been removed from the Cleaning Operations section of this permit.
	Building 4739 and 4707 SOFI Booths have been removed from the Surface Coating section of this permit.

FACILITY-WIDE EMISSIONS

MARSHALL SPACE FLIGHT CENTER FACILITY –WIDE EMISSIONS [TPY]							
	CO	NO _x	PM	SO ₂	VOC	HAP	CO _{2e}
Potential Emissions	3,207	248	286	53	399	323	102,237
2018 Actuals	4.30	6.04	23.79	0.24	5.34	30.09	1,515.24

ABRASIVE BLASTING OPERATIONS REQUIREMENTS

Marshall Space Flight Center operates one significant abrasive blasting operation.

Building 4745 Sand Blasting

This operation utilizes sand as a blast media. This unit is equipped with a baghouse for particulate control. The building is open on two sides. Typical operating schedule for this operation is 8 hours per day and one day per week.

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.02, "Fugitive Dust and Fugitive Emissions" for Control of Particulate Emissions

Each abrasive blasting operation would be subject to the requirements of this subpart.

Emission Standards:

These sources are not subject to any unit specific emissions standards.

Compliance and Performance Test Methods and Procedures:

These sources are not subject to any unit specific emission monitoring requirements.

Emission Monitoring:

These sources are not subject to any unit specific emission monitoring requirements.

Recordkeeping and Reporting Requirements:

These sources are not subject to any unit specific reporting or recordkeeping requirements.

Applicability:

ADEM Admin. Code R 335-3-4-.04(1), "Process Industries – General"

No personnel shall cause or permit the emission of particulate matter in any one hour from any source in a Class I County in excess of the amount resulting from the following equations:

$$E = 3.59P^{0.62}$$

Where P is process weight < 30 tons per hour; OR

$$E = 17.31P^{0.16}$$

Where P is process weight ≥ 30 tons per hour.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

The PSD threshold for this type of facility is 250 TPY of criteria pollutants. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the applicable requirements of this rule.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. The Building 4745 Abrasive Blasting Operation does not have a potential uncontrolled emission rate greater than that of the major source threshold; therefore the requirements of Compliance Assurance Monitoring (CAM) do not apply.

ABRASIVE BLASTING OPERATIONS EMISSIONS

Marshall Space Flight Center used AP-42 emission factors to determine emissions from the sand blasting operation. The potential emissions from this operation are as follows:

ABRASIVE BLASTING EMISSIONS [TPY]		
Building	PM	PM₁₀
4745	65.9	15.6

CLEANING OPERATIONS REQUIREMENTS

Marshall Space Flight Center performs degreasing on aerospace components. The facility operates one bath vapor degreaser, cold solvent hand-wipe cleaning, pipe cleaning, and one air stripper.

Batch Vapor Degreaser (4711-179A-01)

The batch vapor degreaser is used to degrease aerospace components. The degreaser utilizes EnSolv as the solvent.

Pipe Cleaning (PC – Fugitive)

When a new pipeline is installed, or when an existing pipeline is repaired, the pipe must be cleaned before use. Pipelines that carry materials such as liquid oxygen or fuel must be cleaned to Class I standards, which requires the pipe to pass a non-volatile residue (NVR) test and particulate count test. The test requires flushing the line with TCA and sampling the outlet for particulate count and NVR.

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.01, “Visible Emissions” for Control of Particulate Emissions

Vapor batch degreasers (point sources) would be subject to the requirements of this subpart.

Emission Standards:

For all point sources, except for one 6-minute period during any 60-minute period, each emission source shall not discharge into the atmosphere particulate that results in an opacity greater than 20%, as determined by a 6-minute average [335-3-4-.01(a)]. At no time shall an emission source discharge into the atmosphere particulate that results in an opacity greater than 40%, as determined by a 6-minute average [335-3-4-.01(b)].

Applicability:

ADEM Admin. Code R 335-3-4-.02, “Fugitive Dust and Fugitive Emissions” for Control of Particulate Emissions

Fugitive emissions sources would be subject to the requirements of this subpart.

Compliance and Performance Test Methods and Procedures:

These sources are not subject to any unit specific emission monitoring requirements.

Emission Monitoring:

These sources are not subject to any unit specific requirements.

Recordkeeping and Reporting Requirements:

These sources are not subject to any unit specific reporting or recordkeeping requirements.

Applicability:

ADEM Admin. Code R 335-3-4-.04(1), "Process Industries – General"

No person shall cause or permit the emission of particulate matter in any one hour from any source in a Class I County in excess of the amount resulting from the following equations:

$$E = 3.59P^{0.62}$$

Where P is process weight < 30 tons per hour; OR

$$E = 17.31P^{0.16}$$

Where P is process weight \geq 30 tons per hour.

Applicability:

ADEM Admin. Code R 335-3-14, "Prevention of Significant Deterioration [PSD]"

The PSD threshold for this type of facility is 250 TPY of criteria pollutants. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the applicable requirements of this rule.

Applicability:

ADEM Admin. Code R 335-3-16-.03, "Major Source Operating Permits"

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR 64, "Compliance Assurance Monitoring (CAM)"

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

CLEANING OPERATIONS EMISSIONS

Potential emissions for these sources were calculated using material balances.

CLEANING OPERATIONS POTENTIAL EMISSIONS [TPY]		
	Batch Vapor Degreaser	Pipe Cleaning
TCA		16.2
1,4-Dioxane		0.49
1-bromopropane (VOC)	6.42	

SURFACE COATING OPERATIONS REQUIREMENTS

Marshall Space Flight Center operates four (4) paint booths and one (1) insulation application booth.

Building 4602 (4602-1111-01)

This paint booth is used to paint metal test panels. Panels are painted using a spray gun, air-dried, and then sent to a lab for testing of the paint in various conditions. Particulate filters are utilized for particulate control.

Building 4650 (4650-PB-01)

This booth is used to paint signs, metal parts, air conditioning duct work, and picnic benches, among others. This booth is equipped with a waterwash system for particulate control.

Building 4707 (4707-130-01)

This paint booth is used for applying a topcoat to test panels sprayed in the MCC Spray Ablader Cell. This booth is equipped with a filter for particulate control.

Building 4760 (4760-PAINT)

This booth is used for painting metal components parts of space vehicles. Intake filters in the ceiling are utilized for particulate control. This booth also utilizes an electric oven for curing.

Building 4765 (4795-Thermal Protection System Development Facility)

The booth is used to apply primer and cryoinsulating foams on large cylindrical rocket fuel tank parts for the Ares 1 Upper Stage Test articles. Multi-component and Spray on Foam Insulation (SOFI) materials are robotically sprayed onto large scale aluminum test articles.

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.01, “Visible Emissions” for Control of Particulate Emissions

The paint booths located at Marshall Space Flight Center are required to comply with the visible emissions requirements outlined in this rule.

Emission Standards:

Except for one 6-minute period during any 60-minute period, each emission source shall not discharge into the atmosphere particulate that results in an opacity greater than 20%, as determined by a 6-minute average [335-3-4-.01(a)]. At no time shall an emission source discharge into the atmosphere particulate that results in an opacity greater than 40%, as determined by a 6-minute average [335-3-4-.01(b)].

Compliance and Performance Test Methods and Procedures:

These sources are not subject to any unit specific emission monitoring requirements.

Applicability:

ADEM Admin. Code R 335-3-4-.04(1), "Process Industries – General"

No person shall cause or permit the emission of particulate matter in any one hour from any source in a Class I County in excess of the amount resulting from the following equations:

$$E = 3.59P^{0.62}$$

Where P is process weight < 30 tons per hour; OR

$$E = 17.31P^{0.16}$$

Where P is process weight ≥ 30 tons per hour.

Compliance and Performance Test Methods and Procedures:

In the event that testing is required by the Department, Marshall Space Flight Center shall demonstrate compliance with the emission standards above by following the procedures outlined in Method 5 –Determination of Particulate Matter Emissions from Stationary Sources (40 CFR Part 60, Appendix A-3)

Emission Monitoring:

Dry filters associated with each paint booth at Marshall Space Flight Center shall be inspected on or at least an annual basis to ensure maintenance is performed in such a manner as to minimize the emission of particulate matter [335-3-16-.05(c)].

Recordkeeping and Reporting Requirements:

Records of the required dry filter inspections, along with records of any maintenance performed on the filter(s) shall be kept in a manner suitable for inspection for at least five (5) years following the date of generation of the record [335-3-16-.05(c)].

Applicability:

ADEM Admin. Code R 335-3-14, "Prevention of Significant Deterioration [PSD]"

The PSD threshold for this type of facility is 250 TPY of criteria pollutants. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the applicable requirements of this rule. Marshall Space Flight Center has imposed the following ANTI-PSD limits:

- Building 4765 SOFI Booth: VOC emissions from the Building 4765 Paint Booth shall not exceed 39.0 TPY in any consecutive 12-month period based on the premise that all VOCs applied are emitted or are emitted to an emission control device with a control efficiency.

All units with enforceable ANTI-PSD limits will be subject to the following recordkeeping requirements [Rule 335-3-16-.05]:

1. Accurate and understandable records, concerning VOC and HAP emissions, as applicable, shall be kept in a form suitable for inspection for at least 5 years following the date of the record for each paint booth subject to Anti-PSD limits. These records will be made available immediately upon request and will contain the following information:
 - a. The type, quantity in gallons, and weight in lbs, of each VOC and HAP containing materials used each calendar month.
 - b. The HAP content by weight (in pounds per gallon) of each coating used shall be determined using EPA Test Method 311, as defined in 40 CFR Part 63, Appendix A, or equivalent vendor data approved by the Department in advance.
 - c. The VOC content by weight (in pound per gallon) of each VOC containing material used, determined by EPA Test Method 24, as defined in 40 CFR Part 60, Appendix A, or equivalent vendor data approved by the Department in advance. The VOC content of coatings may be determined by test method on a random basis to verify formulation data and such other times as the Department may request;
 - d. The percent by volume and percent of weight of VOCs, HAPs, solids, water and content of each VOC and HAP containing materials used each calendar month.
 - e. Complete inventories of VOC and HAP containing materials (their usage with VOC and HAP content) shall be made at the end of each calendar month. Compliance with VOC, HAP, and PM limits shall be based upon these monthly materials use inventories and the use and control efficiency of the particulate filters. Emissions calculations and records will also incorporate the use and control efficiency of the particulate filters.
 - f. The amount of VOCs and HAPs emitted each calendar month expressed in the units of pounds and tons.
 - g. The rolling twelve month total of VOCs and HAPs emitted in the units of pounds and tons.

Applicability:

ADEM Admin. Code R. 335-3-14-.06, “Determinations for Major Sources in Accordance with Clean Air Act Section 112(g)”

Because HAP emissions greater than 10 TPY of any single HAP or 25 TPY of any combination of HAPS are expected from some of these emissions sources, a case by case MACT review would be necessary. However, in order to avoid this review, Marshall Space Flight Center has imposed the following ANTI-112(g) limits:

- Building 4765 SOFI Booth: : HAP emissions from the Building 4765 Paint Booth shall not exceed 9.5/23.5 TPY in any consecutive 12-month period based on the premise that all HAPs applied are emitted or are emitted to an emission control device with a control efficiency.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR 63 Subpart GG, “National Emission Standards for Hazardous Air Pollutants for Aerospace Manufacturing and Rework Facilities.”

Per §63.741(h), regulated activities associated with space vehicles designed to travel beyond the limits of earth’s atmosphere, including but not limited to satellites, space stations, and the Space Shuttle System (including orbiter, external tanks, and solid rocket boosters), are exempt from the requirements of this subpart, except for depainting operations found in §63.746. Marshall Space Flight Center does not conduct depainting operations as described in §63.746; therefore, this regulation does not apply.

Applicability:

40 CFR 63 Subpart MMMM, “National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products.”

Per §63.3881(c)(4), the surface coating of metal parts and products performed on-site at installations owned or operated by the Armed Forces of the United States or the National Aeronautics and Space Administration, or the surface coating of military munitions manufactured by or for the Armed Forces of the United States is not subject to the requirements of this subpart. This operation will take place on site at an installation owned by the Armed Forces of the United States; therefore, the sources in this section would not be subject to the requirements of this regulation.

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

SURFACE COATING OPERATIONS EMISSIONS

Emissions calculations for surface coating operations were calculated based on material balances, maximum spray gun usage, and MSDS data. Calculations for each booth were based on projected usage.

SURFACE COATING OPERATIONS POTENTIAL EMISSIONS [TPY]						
	4602-1111-01	4650-PB-01	4707-130-01	4760-PAINT	4765-SOFI	TOTAL
PM	0.10	1.10	0.003	0.01	0.09	1.30
VOC	63.9	61.8	72.40	61.8	39.0	298.9
TCA	-	-	24.30	-		24.30
Ethylbenzene	-	-	-	-		--
MIBK	-	6.18	-	-	5.07	11.25
MDI	-	-	-	-	0.01	0.01
Naphthalene	35.2	-	-	-		35.2
Tetrachloroethylene	-	-	46.10	-		46.10
Toluene	0.12	49.40	-	61.80	2.03	113.35
Xylenes	0.06	-	-	-		0.06
Chromium	-	-	-	-	0.001	0.001
Lead	-	-	-	-		--

GASOLINE DISPENSING FACILITIES – STAGE 1 REQUIREMENTS

Marshall Space Flight Center has two (2) storage tanks on site for gasoline dispensing. This facility is located at Building 4611.

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-6-.03, “Loading and Storage of VOC”

The gasoline dispensing facilities located at this site would be subject to the applicable requirements of this rule and, as such, a permanent submerged fill pipe is required for loading and storage of gasoline.

Applicability:

ADEM Admin. Code R 335-3-6-.07(3), (5)(a), and (6), “Gasoline Dispensing Facilities – Stage I”

Gasoline dispensing facilities shall mean any outlet where gasoline is dispensed to motor vehicles from stationary storage tanks. Marshall Space Flight Center has a gasoline dispensing facility on site; therefore Marshall Space Flight Center should comply with the requirements of this rule.

Emission Standards:

The permittee shall not transfer, cause or allow the transfer of gasoline from any gasoline tank truck into a tank unless the tank is equipped with a submerged fill pipe and the vapors displaced from the storage tank during filling are processed by a vapor control system in accordance with ADEM Admin. Code R 335-3-6-.07(4) [ADEM Admin. Code R 335-3-6-.07(3)].

The permittee shall not permit the transfer of gasoline between a gasoline tank truck and this unit unless the gasoline tank truck complies with ADEM Admin. Code R 335-3-6-.20 and the vapor control system is connected and operating in accordance with ADEM Admin. Code R 335-3-6-.07(4) [ADEM Admin. Code R 335-3-6-.07(5)(a)].

The permittee shall not cause or allow gasoline to be spilled, discarded in sewers, stored in open containers, or handled in any other manner that would result in evaporation of the gasoline to the atmosphere [ADEM Admin. Code R 335-3-6-.07(6)].

Compliance and Performance Test Methods and Procedures:

In the event that testing is required by the Department, Marshall Space Flight Center shall demonstrate compliance with the emission standards above by following the procedures outlined in Section 12 of ADEM Admin. Code R 335-3-6-.16, “Testing and Monitoring Procedures for Leaks from Gasoline Tank Trucks and Vapor Collection Systems.”

Emission Monitoring:

This source is not subject to any unit specific requirements.

Recordkeeping and Reporting Requirements:

The permittee shall maintain written records of the monthly throughout quantities in gallons for each unit for a minimum of five (5) years after the date on which the record was created. These records should be readily available to the Department for inspection upon request [ADEM Admin. Code R 335-3-6-.07(5)(b&c)].

Applicability:

ADEM Admin. Code R. 335-3-6-.20, “Leaks from Gasoline Storage Tanks and Vapor Collection Systems”

The gasoline storage tanks located at Marshall Space Flight Center are subject to the applicable requirements of this rule. The gasoline tank trucks shall be equipped with a vapor collection system and a valid Department Air Sticker, which is visibly displayed.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

The PSD threshold for this type of facility is 250 TPY of criteria pollutants. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the applicable requirements of this rule.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

GASOLINE DISPENSING FACILITIES – STAGE 1 EMISSIONS

Emissions for these sources were calculated using AP-42 emissions factors and EPA Tanks Program. The only emissions of significance from the gasoline dispensing facility would be VOCs. VOC emissions from these tanks are expected to be 2.78 TPY.

ENGINE TESTING REQUIREMENTS

Marshall Space Flight Center conducts various tests on solid rocket motors, hybrid rocket motors, and RP-1 engines as well as a Radiant Lamp Facility. The facility also conducts non-standard tests, which vary and may not repeat from year to year.

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.02, “Fugitive Dust and Fugitive Emissions” for Control of Particulate Emissions

The engine test cells located at Marshall Space Flight Center are required to comply with the visible emissions requirements outlined in this rule.

Emission Standards:

These sources are not subject to any specific standards.

Compliance and Performance Test Methods and Procedures:

These sources are not subject to any unit specific test methods and procedures.

Emission Monitoring:

These sources are not subject to any unit specific emission monitoring requirements.

Recordkeeping and Reporting Requirements:

These sources are not subject to any unit specific reporting or recordkeeping requirements.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

The PSD threshold for this type of facility is 250 TPY of criteria pollutants. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the applicable requirements of this rule.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR 63 Subpart P, “National Emission Standards for Hazardous Air Pollutants for Engine Test Cells/Stand”

Per §63.9285, this subpart is applicable if the permittee owns or operates an engine test cell or stand at a major source of HAP emissions. Marshall Space Flight Center operates thirty-four (34) test cells; therefore, Marshall Space Flight Center is subject to the applicable requirements of this rule. However, per §63.9290(b) and 63.9290(d)(1), new/reconstructed sources at an affected source used exclusively for testing combustion turbine engines and existing affected sources do not have to meet the requirements of this subpart or Subpart A of Part 63.

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

ENGINE TESTING EMISSIONS

Expected emissions from the test cells are based on AP-42 emission factors.

ENGINE TEST CELL POTENTIAL EMISSIONS [TPY]							
Cell Number	CO	NO_x	PM	SO₂	VOC	HAP	GHG
Solid Rocket Motor Testing	0.10	2.33	11.0	-	-	7.88	-
Hybrid Rocket Motor Testing	94.6	1.80	188.0	-	-	62.95	-
Liquid Propellant Testing	3013	3.76	19.7	10.0	2.29	0.16	-
Radiant Lamp Facility	19.6	-	-	-	1.37	0.54	-
TOTAL	3,127.3	7.89	218.70	10.0	3.66	71.53	-

SMALL NATURAL GAS BOILERS (APPENDIX A) REQUIREMENTS

Marshall Space Flight Center operates thirty (30) significant or permitted boilers. All boilers are rated less than or equal to 10.0 MMBtu/hr. The units provide steam for space heating and process operations. Twenty-six (26) units are classified as small natural gas boilers. Sixteen (16) of these units combust natural gas only and ten (10) of these units combust primarily natural gas and propane during periods of natural gas curtailment. Boilers in this section are subject to the applicable requirements of 40 CFR 63 Subpart DDDDD, “*National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters.*” Boilers that fall into this category are as follows:

BUILDING NUMBER	RATED CAPACITY (MMBTU/HR)	BUILDING NUMBER	RATED CAPACITY (MMBTU/HR)
4200-BLR0001	6.00	4650-BLR0003	5.00
4200-BLR0002	6.00	4663-BLR0001	3.50
4207-BLR0001	2.00	4663-BLR0002	3.50
4207-BLR0002	2.00	4707-BLR0002	3.50
4209-BLR0001	2.144	4707-BLR0003	3.50
4209-BLR0002	2.144	4707-BLR0004	3.50
4487AB-BLR0001	2.50	4708-BLR0001	2.50
4487AB-BLR0002	2.50	4708-BLR0002	2.50
4491-BLR0001	1.68	4708-BLR0003	3.00
4610-BLR0001	2.50	4708-BLR0004	3.00
4610-BLR0002	2.50	4718-BLR0001	5.10
4650-BLR0001	5.00	4765-BLR0001	3.711
4650-BLR0002	5.00	4765-BLR0002	3.711

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.01, “Visible Emissions” for Control of Particulate Emissions

The small natural gas boilers located at Marshall Space Flight Center are required to comply with the visible emissions requirements outlined in this rule.

Emission Standards:

Except for one 6-minute period during any 60-minute period, each emission source shall not discharge into the atmosphere particulate that results in an opacity greater than 20%, as determined by a 6-minute average [335-3-4-.01(a)]. At no time shall an emission source discharge into the atmosphere particulate that results in an opacity greater than 40%, as determined by a 6-minute average [335-3-4-.01(b)].

Compliance and Performance Test Methods and Procedures:

If necessary, a visible emission observation (VEO) shall be conducted according to either EPA Method 9 or Method 22 found in 40 CFR 60 Appendix A.

Emission Monitoring:

These sources are not subject to any unit specific emission monitoring requirements.

Recordkeeping and Reporting Requirements:

These sources are not subject to any unit specific reporting or recordkeeping requirements.

Applicability:

ADEM Admin. Code R 335-3-4-.03, “Fuel Burning Equipment”

Per this rule, units in Class I Counties with a heat input less than 10.0 MMBtu/hr are given an allowable particulate matter emission rate of 0.5 lb/MMBtu. Particulate matter emissions are expected to be well below the allowable emission rate since natural gas would be the only fuel source for the boilers in this section.

Applicability:

ADEM Admin. Code R 335-3-5-.01(1)(b), “Fuel Combustion”

Per this rule, units installed in Category II Counties have an allowable sulfur dioxide emission rate of 4.0 lb/MMBtu. Sulfur dioxide emissions from the boilers in this section are not expected to exceed the allowable emission rate since natural gas would be the only fuel source for the boilers in this section.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

Marshall Space Flight Center is a major source in regards to this rule. In order to avoid a PSD review, the facility has elected to enforce a requirement that the boilers in this section, with the exception of boilers 4209-1 and 4209-2, which burn LP gas, shall only burn natural gas.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR Part 60 Subpart Dc, “Standards of Performance for Small Industrial – Commercial – Industrial Steam Generating Units”

Per §60.40c, this regulation applies to units with a maximum heat capacity of 100 MMBtu/hr and a minimum heat capacity of 10 MMBtu/hr. The boilers in this section have a heat capacity rating less than 10 MMBtu/hr; therefore, the boilers in this section would not be subject to this rule.

Applicability:

40 CFR Part 63 Subpart DDDDD, “National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters”

Per §63.7485, a boiler is subject to the applicable requirements of this subpart if it meets the definition of an industrial, commercial, or institutional boiler or process heater as defined in §63.7575 that is located at, or is a part of, a major source of HAP. The boilers in this section meet the definition of a boiler or process heater in this subpart and are located at a major source of HAP emissions; therefore, the boilers in this section would be subject to any applicable requirement of this rule.

Emission Standards

The boilers in this section are not subject any numerical emission standards in this rule. However, per §63.7500(a)(3) and Table 3 of this subpart, the owner or operator must conduct a tune-up every five years or biennially as specified in §63.7540. The Permittee shall combust natural gas only.

Compliance and Performance Test Methods and Procedures

Per §63.7500(a)(3), the permittee must operate and maintain these sources, at all times, in a manner consistent with safety and good air pollution control practices for minimizing emissions. Boilers in this category that are classified as new or reconstructed (constructed or reconstructed after June 4, 2010) must be in compliance with the applicable portions of this subpart by January 31, 2013 or upon startup, whichever is later [§63.7495(a)]. Boilers in this section classified as existing (constructed before June 4, 2010) were required to be in compliance with the applicable requirements of this subpart no later than January 31, 2016 [§63.7495(b)].

Emission Monitoring

Marshall Space Flight Center must conduct a tune-up of each boiler with a heat input capacity less than 5 MMBtu/hr every five (5) years as specified in §63.7540(a)(10)(i)-(vi) [§63.7540(a)(12)]. Biennial tune-ups of each boiler rated between 5 MMBtu/hr and 10 MMBtu/hr should be conducted as specified in §63.7540(a)(10)(i)-(vi) [§63.7540(a)(11)]. If a boiler is not operating on the required tune-up date, the tune-up must be completed within one (1) week of startup of the boiler

Reporting and Recordkeeping Requirements

The Permittee must submit a biennial or 5-year compliance report as required by §63.7550(b). The facility must maintain records as outlined in §63.7555(a) for a period of five (5) years after the date of generation of the record.

Applicability:

40 CFR Part 63 Subpart JJJJJJ, “National Emission Standards for Hazardous Air Pollutants for Industrial Commercial, and Institutional Boilers Area Sources”

Per §63.11193, an industrial, commercial, or institutional boiler that is located at or is part of an area source of hazardous air pollutants (HAPs) is subject to the applicable requirements of this rule. Marshall Space Flight Center is a major source of HAPs; therefore, the boilers in this section would not be subject to the requirements of this rule.

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

SMALL NATURAL GAS BOILERS (APPENDIX A) EMISSIONS

Expected emissions were calculated using AP-42 emission factors and continuous operation.

SMALL NATURAL GAS FIRED BOILERS EXPECTED EMISSIONS [TPY]							
Boiler	PM	SO₂	NO_x	CO	VOC	HAPs	GHGs
4200- BLR0001	0.2	0.43	3.73	2.16	0.23		
4200- BLR0002	0.2	0.43	3.73	2.16	0.23		
4207- BLR001	0.07	0.14	1.24	0.72	0.077		
4207- BLR002	0.067	0.14	1.24	0.72	0.077		
4487AB- BLR0001	0.08	0.18	1.56	0.90	0.10		
4487AB- BLR0002	0.08	0.18	1.56	0.90	0.10		
4650- BLR0001	0.17	0.36	3.11	1.80	0.19		
4650- BLR0002	0.17	0.36	3.11	1.80	0.19		
4650- BLR0003	0.17	0.36	3.11	1.80	0.19		
4663- BLR0001	0.12	0.25	2.18	1.26	0.13		
4663- BLR0002	0.12	0.25	2.18	1.26	0.13		
4707- BLR0002	0.12	0.25	2.18	1.26	0.13		
4707- BLR0003	0.12	0.25	2.18	1.26	0.13		
4707- BLR0004	0.12	0.25	2.18	1.26	0.13		
4765- BLR0001	0.12	0.27	2.31	1.34	0.14		
4765- BLR0002	0.12	0.27	2.31	1.34	0.14		
4209- BLR0001	0.072	0.154	1.33	0.77	0.082		
4209- BLR0002	0.072	0.154	1.33	0.77	0.082		
4491- BLR0001	0.055	0.004	0.72	0.61	0.04		
4610- BLR0001	0.08	0.01	1.07	0.90	0.06		
4610- BLR0002	0.08	0.01	1.07	0.90	0.06		

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4610- BLR0001	2.50	0.006	1.07	0.90	0.06		
4610- BLR0002	2.50	0.006	1.07	0.90	0.06		
4650- BLR0003	5.00	0.01	1.29	1.08	0.07		
4650- BLR0004	5.00	0.01	1.29	1.08	0.07		
4718- BLR0001	0.17	0.01	2.19	1.84	0.12		
Total	2.936	4.74	50.34	31.69	3.018	-	-

SMALL FUEL OIL/ DUAL FUEL BOILERS (APPENDIX B) REQUIREMENTS

Boilers located at Marshall Space Flight Center are used to generate heat for various facilities on site. These boilers are classified as “small fuel oil/dual fuel” boilers because each boiler has a rated heat capacity of less than 10 MMBtu/hr and will burn either No. 2 fuel oil or natural gas only. The boilers that fall into this category are as follows:

BUILDING NUMBER	RATED CAPACITY (MMBTU/HR)	BUILDING NUMBER	RATED CAPACITY (MMBTU/HR)
Portable Boiler #1	8.37	Portable Boiler#2	4.185
Portable Boiler #3	0.84	Portable Boiler #4	2.092

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.01, “Visible Emissions” for Control of Particulate Emissions

The boilers located at Marshall Space Flight Center are required to comply with the visible emissions requirements outlined in this rule.

Emission Standards:

Except for one 6-minute period during any 60-minute period, each emission source shall not discharge into the atmosphere particulate that results in an opacity greater than 20%, as determined by a 6-minute average [335-3-4-.01(a)]. At no time shall an emission source discharge into the atmosphere particulate that results in an opacity greater than 40%, as determined by a 6-minute average [335-3-4-.01(b)].

Compliance and Performance Test Methods and Procedures:

If necessary, a visible emission observation (VEO) shall be conducted according to either EPA Method 9 or Method 22 found in 40 CFR 60 Appendix A.

Emission Monitoring:

These sources are not subject to any unit specific emission monitoring requirements.

Recordkeeping and Reporting Requirements:

These sources are not subject to any unit specific reporting or recordkeeping requirements.

Applicability:

ADEM Admin. Code R 335-3-4-.03, “Fuel Burning Equipment”

Per this rule, units in Class I Counties with a heat input less than 10.0 MMBtu/hr are given an allowable particulate matter emission rate of 0.5 lb/MMBtu. Particulate matter emissions are expected to be well below the allowable emission rate since No.2 fuel oil and natural gas would be the only fuel source for the boilers in this section.

Applicability:

ADEM Admin. Code R 335-3-5-.01(1)(b), “Fuel Combustion”

Per this rule, units installed in Category II Counties have an allowable sulfur dioxide emission rate of 4.0 lb/MMBtu. Sulfur dioxide emissions from the boilers in this section are not expected to exceed the allowable emission rate since No.2 fuel oil and natural gas would be the only fuel source for the boilers in this section.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

Marshall Space Flight Center is a major source in regards to this rule. In order to avoid a PSD review, the facility has elected to enforce the following requirements:

- The units in this section shall burn natural gas or No. 2 fuel oil only. The sulfur content of the No. 2 fuel oil shall not exceed 0.5% by weight.

The sulfur content of the fuel oil delivered to the boilers shall be measured in accordance with ASTM D129-64 or an alternative method approved by the Department. Records of the sulfur content of the fuel oil combusted must be kept in a form suitable for inspection and be made available upon request. These records should be retained for a period of at least five (5) years following the date of generation of the record [ADEM Admin. Code R 335-3-16-.05(c)].

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR Part 60 Subpart D_c, “Standards of Performance for Small Industrial – Commercial – Industrial Steam Generating Units”

Per §60.40c, this regulation applies to units with a maximum heat capacity of 100 MMBtu/hr and a minimum heat capacity of 10 MMBtu/hr. The boilers in this section have a heat capacity rating less than 10 MMBtu/hr; therefore, the boilers in this section would not be subject to this rule.

Applicability:

40 CFR Part 63 Subpart DDDDD, “National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters”

Per §63.7485, a boiler is subject to the applicable requirements of this subpart if it meets the definition of an industrial, commercial, or institutional boiler or process heater as defined in §63.7575 that is located at, or is a part of, a major source of HAP. The boilers in this section meet the definition of a boiler or process heater in this subpart and are located at a major source of HAP emissions; therefore, the boilers in this section would be subject to any applicable requirement of this rule.

Emission Standards

The boilers in this section are not subject any numerical emission standards in this rule. However, per §63.7500(a)(3) and Table 3 of this subpart, the owner or operator must conduct a tune-up every five years or biennially as specified in §63.7540.

Compliance and Performance Test Methods and Procedures

Per §63.7500(a)(3), the permittee must operate and maintain these sources, at all times, in a manner consistent with safety and good air pollution control practices for minimizing emissions. Boilers in this category that are classified as new or reconstructed (constructed or reconstructed after June 4, 2010) must be in compliance with the applicable portions of this subpart by January 31, 2013 or upon startup, whichever is later [§63.7495(a)]. Boilers in this section classified as existing (constructed before June 4, 2010) were required to be in compliance with the applicable requirements of this subpart no later than January 31, 2016 [§63.7495(b)].

Emission Monitoring

Marshall Space Flight Center must conduct a tune-up of each boiler with a heat input capacity less than 5 MMBtu/hr every five (5) years as specified in §63.7540(a)(10)(i)-(vi) [§63.7540(a)(12)]. Biennial tune-ups of each boiler rated between 5 MMBtu/hr and 10 MMBtu/hr should be conducted as specified in §63.7540(a)(10)(i)-(vi) [§63.7540(a)(11)]. If a boiler is not operating on the required tune-up date, the tune-up must be completed within one (1) week of startup of the boiler.

Reporting and Recordkeeping Requirements

Marshall Space Flight Center shall keep records of all tune-ups, maintenance, and inspections conducted on these boilers for a period of five (5) years. Marshall Space Flight Center should also keep a record of each notification and report that is submitted to comply with this subpart. All records should be readily available for inspection. The Permittee must submit a biennial or 5-year compliance report as required by §63.7550(b).

Applicability:

40 CFR Part 63 Subpart JJJJJJ, “National Emission Standards for Hazardous Air Pollutants for Industrial Commercial, and Institutional Boilers Area Sources”

Per §63.11193, an industrial, commercial, or institutional boiler that is located at or is part of an area source of hazardous air pollutants (HAPs) is subject to the applicable requirements of this rule. Marshall Space Flight Center is a major source of HAPs; therefore, the boilers in this section would not be subject to the requirements of this rule.

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

SMALL FUEL OIL/DUAL FUEL BOILERS (APPENDIX B) EMISSIONS

Potential emissions were calculated using AP-42 emission factors and continuous operation.

SMALL FUEL OIL/DUAL FUEL BOILERS EXPECTED EMISSIONS [TPY]								
Boiler	PM	SO₂	NO_x	CO	VOC	HAP	GHGs	NH₃
Portable Boiler #1	0.52	18.60	5.24	3.02	0.20	0.08		
Portable Boiler #2	0.26	9.30	2.62	1.51	0.10	0.04		
Portable Boiler #3	0.053	1.87	0.53	0.131	0.009	0.002		
Portable Boiler #4	0.13	4.65	1.31	0.33	0.02	0.004		
Total	0.963	34.42	9.70	4.99	0.33	0.13	-	-

NSPS SUBPART III – RECIPROCATING INTERNAL COMBUSTION ENGINES (RICE) **[APPENDIX C] REQUIREMENTS**

Marshall Space Flight Center operates 64 significant engines, which are classified into three (3) categories. Twenty-one (21) engines are classified as NSPS compression ignition emergency engines. The engines in this section vary in size and power rating and are run on diesel fuel. Generators that were constructed after April 1, 2006 are subject to the applicable requirements in 40 CFR 60 Subpart IIII. Generators constructed before the applicability date are subject to 40 CFR 63 Subpart ZZZZ. The generators in this category are as follows:

UNIT ID	RATED CAPACITY (HP)	UNIT ID	RATED CAPACITY (HP)
4201-GEN0003	364	4208-GEN001	2,921
4220-GEN0001	230	4221-GEN0001	463
4250-GEN0001	80.4	4464-GEN0001	49
4487-GEN0001	158	4583-GEN0001	197
4601-GEN0001	27.1	4602-GEN0001	635
4610-GEN0004	241	4611-GEN0001	80
4650-GEN0001	755	4651-GEN0001	201
4666-GEN0001	133	4674-GEN0001	198
4708-GEN0001	1,207	4711-GEN0001	49
4755-GEN0001	1,194	4765-GEN0001	48.8
4778-GEN0001	80		

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.01, “Visible Emissions” for Control of Particulate Emissions

The generators located at Marshall Space Flight Center are required to comply with the visible emissions requirements outlined in this rule.

Emission Standards:

Except for one 6-minute period during any 60-minute period, each emission source shall not discharge into the atmosphere particulate that results in an opacity greater than 20%, as determined by a 6-minute average [335-3-4-.01(a)]. At no time shall an emission source discharge into the atmosphere particulate that results in an opacity greater than 40%, as determined by a 6-minute average [335-3-4-.01(b)].

Compliance and Performance Test Methods and Procedures:

If necessary, a visible emission observation (VEO) shall be conducted according to either EPA Method 9 or Method 22 found in 40 CFR 60 Appendix A.

Emission Monitoring:

There are no emissions monitoring requirements for these units.

Recordkeeping and Reporting Requirements:

There are no recordkeeping or reporting requirements for these units.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to any applicable requirement in this rule.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR Part 60 Subpart III, “Standards of Performance for Stationary Compression Ignition Internal Combustion Engines”

Per §60.4200(a), this regulation is applicable to compression ignition engines manufactured after April 1, 2006. The generators in this section that meet the criteria listed in §60.4200(a) would be subject to the requirements of this rule.

Emission Standards:

Pre- 2007 models with a displacement less than 10 liters per cylinder must comply with the emissions standards in Table 1 of this subpart [§60.4205(a)]; post 2007 models with a displacement less than 30 liters per cylinder must comply with the requirements in §60.4202 [§60.4205(b)]. Per §60.4202, engines that fall in this category are subject to opacity standards outlined in §89.113. Owners and operators that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a) [§60.4207(a)]. Owners and operators of generators with a displacement less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a) for nonroad diesel fuel, except that any existing diesel fuel purchase prior to October 1, 2010 may be used until depleted.

Compliance and Performance Test Methods and Procedures

Owners and operators that must comply with the emissions standards of this subpart must do the following [§60.4211(a)(1)-(3)]:

1. Operate and maintain the generator and control device according to the manufacturer's emission-related written instructions;
2. Change only those emission-related setting that are permitted by the manufacturer; and
3. Meet the requirements of 40 CFR Parts 89, 94, and/or 1068 as applicable.

Owners and operators of 2007 and later model year generators that must comply with the emissions standards in §60.4204(b) or §60.4205(b) must demonstrate compliance by purchasing a generator certified to the emissions standards for the same model year and maximum engine power [§60.4211(c)]. Emergency generators must be operated according to the requirements outlined in §60.4211(f).

Emission Monitoring

If the emergency generator does not meet the standards of non-emergency generators, Marshall Space Flight Center must install a non-resettable hour meter [§60.4209(a)].

Reporting and Recordkeeping Requirements

Marshall Space Flight Center must keep records of the operation of the emergency generators in this section in emergency and non-emergency service that are recorded through the non-resettable hour meter. Marshall Space Flight Center must record the time of operation of the engine and the reason the engine was in operation during that time [§60.4214(b)].

Applicability:

40 CFR Part 60 Subpart JJJJ, “Standards of Performance for Stationary Spark Ignition Internal Combustion Engines”

Per §60.4230(a), the provisions of this subpart are applicable to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE). The generators in this section are compression ignition; therefore, the proposed generators would not be subject to this rule.

Applicability:

40 CFR 63 Subpart ZZZZ, “National Emission Standards for Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines”

Per §63.6590, this subpart is applicable to new, reconstructed or existing stationary RICE located at a major source or area source of HAP emissions. Existing stationary RICE are defined as RICE constructed or reconstructed before December 19, 2002 with a rating greater than 500 HP or RICE constructed/reconstructed before June 12, 2006 with a rating of less than 500 HP. New stationary RICE are defined as a stationary RICE with a rating greater than 500 HP that commenced construction on or after December 19, 2002 or a stationary RICE rated

less than 500 HP that commenced construction on or after June 12, 2006. Generators in this section are subject to these requirements. Generators that meet any of the criteria in §63.6590(c) meet the requirements of this subpart by meeting the requirements of 40 CFR Part 60 Subpart IIII for compression ignition engines. New and reconstructed generators greater than 500 HP are only subject to the initial notification requirements of this subpart [§63.6590(b)(1)(i)]. Existing emergency generators greater than 500 HP that do not operate or are not contractually obligated to operate more than 15 hours per calendar year for the purposes specified in §6306640(f)(2)(ii) and (iii) do not have to meet the requirements of this subpart [§63.6590(b)(3)(iii)].

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

NSPS SUBPART III – RECIPROCATING INTERNAL COMBUSTION ENGINES (RICE)
[APPENDIX C] EMISSIONS

The expected emissions for the generators in this section were calculated using manufacturer’s literature, 40 CFR 89.112, and AP-42 emission factors.

NSPS III GENERATORS – EXPECTED EMISSIONS [TPY]								
UNIT ID	PM	Formaldehyde	NO_x	VOC	CO	SO₂	HAP	GHGs
4201-GEN0003	0.030	7.52E-04	0.601	-	0.521	0.187	0.002	105
4208	0.198	-	7.67	-	4.20	0.009	0.008	841
4220	0.034	-	0.378	-	0.594	0.118	0.002	66.2
4221-GEN0001	0.02	9.56E-04	0.72	0.01	0.17	0.24	3.04E-03	133.3
4250	0.013	-	0.155	-	0.165	0.041	0.001	23.2
4464-GEN0001	0.012	1.01E-04	0.148	0.004	0.111	0.025	3.22E-04	14.1
4487-GEN0001	0.011	3.26E-04	0.22	0.01	0.084	0.081	1.04E-03	-
4583-GEN0001	0.01	-	0.304	0.01	0.098	0.101	0.001	-
4601	0.007	-	0.084	-	0.061	0.014	1.78E-04	7.80
4602	0.045	-	0.888	0.042	0.343	0.002	0.002	183
4610-GEN0004	0.0003	-	0.016	0.003	0.003	0.124	1.58E-03	69.4
4611	0.007	-	0.125	0.007	0.056	0.041	5.25E-04	23.0
4650-GEN0001	0.062	1.04E-04	2.00	-	1.09	0.002	0.002	217
4651-GEN0001	0.0002	-	0.013	0.002	0.002	0.103	1.32E-03	58.0
4666-GEN0001	0.009	2.75E-04	0.186	0.008	0.071	0.068	8.73E-04	38.3
4674-GEN0001	0.013	-	0.23	0.08	0.076	0.10	1.30E-03	57
4708-GEN0001	0.084	1.67E-04	2.66	1.24	0.30	0.004	0.003	-
4711-GEN0001	0.006	1.01E-04	0.120	0.013	0.054	0.025	3.22E-04	14.1
4755-GEN0001	0.034	-	2.705	0.105	0.355	0.004	0.003	344.0
4765-GEN0001	0.005	1.01E-04	0.13	0.004	0.018	0.025	3.20E-04	-
4778	0.001	1.65E-04	0.125	0.007	0.164	0.043	5.25E-04	
Total	0.602	0.002	19.478	1.545	8.539	1.357	0.035	2,194.4

MACT SUBPART ZZZZ – RECIPROCATING INTERNAL COMBUSTION ENGINES (RICE) [APPENDIX D] REQUIREMENTS

The generators in this section are classified as Existing Emergency Generators subject to MACT ZZZZ because they were manufactured prior to the applicability dates in 40 CFR 60 Subpart IIII for compression ignition engines and 40 CFR 60 Subpart JJJJ for spark ignition engines. The generators in this category are as follows:

<u>Building Number</u>	<u>Source Number</u>	<u>HP</u>	<u>Fuel</u>
4200	4200-GEN0001	449	Diesel
4201	4201-GEN0002	140	Diesel
4203	4203-GEN0001	474	Diesel
4209	4209-GEN0001	764	Diesel
4249	4249-GEN0001	435	Diesel
4312	4312-GEN0001	169	Diesel
4436	4436-GEN0001	352	Diesel
4475	4475-GEN0001	750	Diesel
4476	4476-GEN0001	43.7	Diesel
4487	4487C-GEN0001	680	Diesel
4493	4493-GEN0001	660	Diesel
4600	4600-GEN0001	37.1	Diesel
4605	4605-GEN0001	87	Propane
4619	4619-GEN0001	160	Diesel
4629	4629-GEN0001	605	Diesel
4649	4649-GEN0001	221	Diesel
4649	4649-GEN0002	202	Diesel
4663	4463-GEN0001	765	Diesel
4663	4463-GEN0002	765	Diesel
4663	4463-GEN0003	1,106	Diesel
4663	4463-GEN0004	2,847	Diesel
4663	4663-GEN0005	2,520	Diesel
4667	4667-999-01	2,577	Diesel
4667	4667-999-02	2,577	Diesel
4667	4667-999-03	2,577	Diesel
4667	4667-999-04	2,577	Diesel
4667	4667-999-05	2,577	Diesel
4667	4667-999-06	2,577	Diesel
4667	4667-999-07	2,577	Diesel
4667	4667-999-08	2,577	Diesel
4667	4667-999-09	2,577	Diesel
4667	4667-999-10	2,577	Diesel

4667	4667-999-11	2,577	Diesel
4667	4667-999-12	2,577	Diesel
4667	4667-999-13	2,577	Diesel
4692	4692-GEN0001	65	Diesel
4707	4707-GEN0001	765	Diesel
4708	4708-GEN0002	1,199	Diesel
4718	4718-3-GEN0001	600	Diesel
4718	4718-GEN0002	880	Diesel
4761	4761--GEN0001	109	Diesel

STATE REGULATIONS

Applicability:

ADEM Admin. Code R 335-3-4-.01, “Visible Emissions” for Control of Particulate Emissions

The engines in this section are required to comply with the visible emissions requirements outlined in this rule.

Emission Standards:

Except for one 6-minute period during any 60-minute period, each emission source shall not discharge into the atmosphere particulate that results in an opacity greater than 20%, as determined by a 6-minute average [335-3-4-.01(a)]. At no time shall an emission source discharge into the atmosphere particulate that results in an opacity greater than 40%, as determined by a 6-minute average [335-3-4-.01(b)].

Compliance and Performance Test Methods and Procedures:

If necessary, a visible emission observation (VEO) shall be conducted according to either EPA Method 9 or Method 22 found in 40 CFR 60 Appendix A.

Emission Monitoring:

There are no emissions monitoring requirements for these units.

Recordkeeping and Reporting Requirements:

There are no recordkeeping or reporting requirements for these units.

Applicability:

ADEM Admin. Code R 335-3-14, “Prevention of Significant Deterioration [PSD]”

Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to any applicable requirement in this rule. In order to avoid a PSD review for this project, MSFC has elected to impose a fuel oil limit of 456,691 gallons/year for all thirteen (13) engines located in Building 4667. Marshall Space Flight Center shall demonstrate compliance with this limit by maintaining records of the monthly and twelve-month rolling totals of fuel oil usage in the Building 4667 generators. These records should be kept in a

form suitable for inspection for a period of five (5) years from the date the fuel oil is consumed.

Applicability:

ADEM Admin. Code R 335-3-16-.03, “Major Source Operating Permits”

The major source threshold is 100 TPY of criteria pollutants, 10 TPY of a single HAP, and 25 TPY of a combination of HAPs. Marshall Space Flight Center is a major source in regards to this rule; therefore, the facility would be subject to the requirements of this rule.

FEDERAL REGULATIONS

Applicability:

40 CFR Part 60 Subpart IIII, “Standards of Performance for Stationary Compression Ignition Internal Combustion Engines”

This regulation applies to owners and operators of engines that commence construction after July 11, 2005, where the engines are manufactured on or after April 1, 2006 and are not fire pump engines. The compression ignition generators in this section that were manufactured prior to April 1, 2006; therefore, the thirteen (13) pump engines in Building 4667 are not subject to the requirements of this regulation [§60.4200(a)(3)].

Applicability:

40 CFR Part 60 Subpart JJJJ, “Standards of Performance for Stationary Spark Ignition Internal Combustion Engines”

This regulation applies to owners and operators of spark ignition engines that commenced construction after July 1, 2008 where the engines are manufactured on or after January 1, 2009, for emergency engines with a maximum engine power greater than 25 HP. The engines located in Building 4667 are compression ignition engines; therefore, the engines would not be subject to the requirements of this rule.

Applicability:

40 CFR 63 Subpart ZZZZ, “National Emission Standards for Hazardous Air Pollutants For Stationary Reciprocating Internal Combustion Engines”

Per §63.6590, this subpart is applicable to new, reconstructed or existing stationary RICE located at a major source or area source of HAP emissions. Existing stationary RICE are defined as RICE constructed or reconstructed before December 19, 2002 with a rating greater than 500 HP or RICE constructed/reconstructed before June 12, 2006 with a rating of less than 500 HP. New stationary RICE are defined as a stationary RICE with a rating greater than 500 HP that commenced construction on or after December 19, 2002 or a stationary RICE rated less than 500 HP that commenced construction on or after June 12, 2006. Generators in this section are subject to these requirements. Generators that meet any of the criteria in §63.6590(c) meet the requirements of this subpart by meeting the requirements of 40 CFR Part 60 Subpart IIII for compression ignition engines. New and reconstructed generators greater than 500 HP are only subject to the initial notification requirements of this subpart

[§63.6590(b)(1)(i)]. Existing emergency generators greater than 500 HP that do not operate or are not contractually obligated to operate more than 15 hours per calendar year for the purposes specified in §6306640(f)(2)(ii) and (iii) do not have to meet the requirements of this subpart [§63.6590(b)(3)(iii)].

Emission Standards:

The generators in this section are subject to the applicable requirements in Table 2c of this subpart [§63.6602]. Marshall Space Flight Center must operate and maintain the units in this section according to the manufacturer's emission related written instructions or develop a maintenance plan, which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions [§63.6625(e)(2)].

Compliance and Performance Test Methods and Procedures:

Marshall Space Flight Center must operate and maintain the units in this section according to the manufacturer's emission related written instructions or develop a maintenance plan, which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions [§63.6625(e)(2)]. These units may be operated for the purpose of maintenance checks and readiness testing; however, this type of operation is limited to 100 hours per calendar year. There is no time limit on the use of the generators in emergency situations. The generators in this section may operate up to 50 hours per calendar year for non-emergency situations, which is included in the allotted 100 hours per year for maintenance checks and readiness testing. The 50 hours per calendar year may not be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply non-emergency power as part of a financial arrangement with another entity [§63.6640(f)(1)].

Emission Monitoring:

Marshall Space Flight Center must install a non-resettable hour meter on each applicable unit [§63.6625(f)]. The facility should perform the following monitoring activities as specified in Table 2c of this subpart: change the oil filter every 500 hours of operation or annually, whichever comes first; inspect all air filters every 1,000 hours of operation or annually, whichever comes first, and inspect all hoses and belts every 500 hours of operation or annually, whichever comes first and replace as necessary [40 CFR Part 63 Subpart ZZZZ, Table 2c(1), (6)].

Reporting and Recordkeeping Requirements:

Marshall Space Flight Center must keep records of the maintenance conducted on the units in this section in order to demonstrate that the units were operated according to the maintenance plan [§63.6655(e)]. Marshall Space Flight Center must keep records of the hours of operation of each engine that is recorded through the non-resettable hour meter. The facility should document how many hours are spent for emergency operation, including why the operation was considered emergency, and how many hours were spent in non-emergency

operation. If the engines were used for demand response operation, Marshall Space Flight Center must keep records of the notification of the emergency situation and the time the engine was operated as part of the demand response [§63.6655(f)].

Applicability:

40 CFR 64, “Compliance Assurance Monitoring (CAM)”

Compliance Assurance Monitoring (CAM) is required if the unit meets the following requirements: the unit is subject to an emission limit or standard, a control device is used to achieve compliance with the emission limit or standards, and pre-controlled emissions are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. These units do not have pre-controlled potential emissions greater than any major source threshold; therefore, CAM does not apply.

MACT SUBPART ZZZZ – EXISTING EMERGENCY GENERATORS (APPENDIX D) EMISSIONS

The emissions for these generators were calculated using manufacturer’s literature and AP-42 emission factors.

MACT ZZZZ GENERATORS – EXPECTED EMISSIONS [TPY]							
Building	PM	NO _x	VOC	CO	SO ₂	HAP	GHGs
4200-GEN0001	0.247	3.48	0.277	0.75	0.23	0.003	129
4201-GEN0002	0.077	1.09	0.086	0.234	0.072	0.001	40.3
4203-GEN0001	0.261	3.67	0.293	0.792	0.243	0.003	137
4209-GEN0001	0.093	4.58	0.123	1.05	0.002	0.002	220.0
4249-GEN0001	0.239	3.37	0.269	0.726	0.223	0.003	125.0
4312-GEN0001	0.093	1.31	0.104	0.282	0.087	0.001	48.7
4436-GEN0001	0.039	0.872	0.027	0.116	0.180	0.002	101
4475-GEN0001	0.091	4.50	0.120	1.03	0.002	0.002	216
4476-GEN0001	0.024	0.339	0.027	0.073	0.022	2.87E-04	12.6
4487C-GEN0001	0.082	4.08	0.109	0.935	0.002	0.002	196
4493-GEN0001	0.080	3.96	0.106	0.908	0.002	0.002	190
4600-GEN0001	0.020	0.288	0.023	0.062	0.019	2.44E-04	10.7
4605-GEN0001	0.008	0.231	0.138	0.215	0.001	0.029	20.7
4619-GEN0001	0.088	1.24	0.099	0.267	0.082	0.001	46.1
4629-GEN0001	0.077	2.84	0.113	0.20	0.20	0.002	174
4649-GEN0001	0.122	1.71	0.136	0.369	0.113	0.001	63.6
4649-GEN0002	0.111	1.57	0.125	0.337	0.104	0.001	58.2
4663-GEN0001	0.093	4.59	0.123	1.05	0.002	0.002	220
4663-GEN0002	0.093	4.59	0.123	1.05	0.002	0.002	220
4663-GEN0003	0.134	6.64	0.178	1.52	0.003	0.003	319
4663-GEN0004	0.345	17.1	0.457	3.91	0.009	0.007	820
4663-GEN0005	0.305	15.1	0.404	3.47	0.008	0.007	726
4667-999-01	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-02	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-03	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-04	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-05	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-06	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-07	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002

MACT ZZZZ GENERATORS – EXPECTED EMISSIONS [TPY]							
Building	PM	NO_x	VOC	CO	SO₂	HAP	GHGs
4667-999-08	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-09	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-10	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-11	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-12	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4667-999-13	0.062	3.1	0.082	0.70	0.002	9.45E-05	0.002
4692-GEN0001	0.036	0.504	0.040	0.109	0.033	4.27E-04	18.7
4707-GEN0001	0.093	4.59	0.123	1.05	0.002	0.002	220
4708-GEN0002	0.145	7.19	0.192	1.65	0.004	0.003	345
4718-3- GEN0001	0.330	4.65	0.371	1.00	0.308	0.004	173
4718-GEN0002	0.107	5.28	0.141	1.21	0.003	0.002	253
T4728- GEN0001	NAV	0.033	0.045	0.021	0.002	0.001	3.25
4755-GEN0002	0.164	2.32	0.185	0.499	0.153	0.002	86.1
4761-GEN0001	0.060	0.845	0.067	0.182	0.056	0.001	31.4
Total	4.463	152.86	5.69	34.17	2.19	0.09	5,224.38
Total	4.299	150.51	5.46	33.65	2.04	0.09	5,135.03
Difference	0.164	2.35	0.23	0.52	0.115	0	89.35

RECOMMENDATIONS

Based on this analysis and pending the resolution of any comments received during the 30-day public comment period and the 45-day EPA review, I recommend issuing Marshall Space Flight Center's Title V MSOP Renewal.

Chrystal Strickland

March 30, 2020

Chrystal Strickland
 Industrial Minerals Section
 Energy Branch
 Air Division

Date